Global upper ocean heat content analyses for use in tropical cyclone intensity forecasting

Clark Rowley

It is widely acknowledged that ocean surface temperatures play an important role in determining the intensity of tropical cyclones, but a measure of the thickness of the layer of warm ocean surface water is a more useful indicator of the energy available for storm intensification. It has also been demonstrated that using upper ocean heat content as a predictor improves the skill of statistical hurricane intensity models. The Naval Oceanographic Office produces daily operational three-dimensional analyses of ocean temperature and salinity that can be used to determine the upper ocean heat content. Here, we describe an experimental system being used to present upper ocean heat content information to tropical cyclone forecasters.

The development system derives the hurricane heat content by integrating the ocean heat content from the surface down to the 26 C isotherm, referenced to the heat content of 26 C water. The heat content, surface temperature, and surface height anomaly fields are presented graphically on an internet WWW site for selected regions, and values are extracted along the forecast track for active storms. Independent in situ profile data are used to validate the hurricane heat content values, and the validation results are provided on the site as well. The URL for the site is http://www7320.nrlssc.navy.mil/hhc/.